Amendments to the Claims:

This listing of the claims will replace all prior versions, and listings of claims in the application.

Listings of Claims:

1. (Currently Amended) A spin-valve type thin film magnetic element comprising:

a laminate comprising an antiferromagnetic layer, a pinned magnetic layer in contact with an antiferromagnetic layer in which the magnetization direction of the pinned magnetic layer is fixed by an exchange anisotropic magnetic field with the antiferromagnetic layer, and a non-magnetic conductive layer formed between the pinned magnetic layer and a free magnetic layer;

bias layers for aligning the magnetization direction of the free magnetic layer in the direction substantially perpendicular to the magnetization direction of the pinned magnetic layer;

ferromagnetic layers formed in contact with the bias layers; and

conductive layers for applying a sensing current to the free magnetic layer,

wherein each of the ferromagnetic layers is divided into two sub-layers separated by a first non-magnetic intermediate layer, the sub-layers being in a ferrimagnetic state in which the magnetization direction of one sub-layer is 180 degrees different from the magnetization direction of the other sub-layer, and

wherein the free magnetic layer is divided into two sub-layers separated by a second non-magnetic intermediate layer, the sub-layers being in a ferrimagnetic state in which the magnetization direction of one sub-layer is 180 degrees different from the magnetization direction of the other sub-layer, and wherein the bias layers comprise at least one material selected from the group consisting of α-Fe_2O_3 and CoO, and

wherein the antiferromagnetic layer comprises an alloy containing at least one element selected from the group of Pt, Pd, Rh, Fe, Ru, Ir, Os, Au, Ag, Cr, Ni, Ne, Ar, Xe and Kr, and Mn.

2. (Previously Presented) The spin-valve type thin film magnetic element according to Claim 1, wherein ferromagnetic layers are disposed on the free magnetic layer with a distance corresponding to a track width, the bias layers being provided on the ferromagnetic layers and the conductive layers being provided on the bias layers.

3. (Previously Presented) The spin-valve type thin film magnetic element according to Claim 1, wherein the bias layers are provided at both sides in the track width direction of the laminate, the ferromagnetic layers being provided on the bias layers and the conductive layers being provided on the ferromagnetic layers.

4. (Cancelled)

5. (Previously Presented) The spin-valve type thin film magnetic element according to Claim 1, wherein the ferromagnetic layer comprises at least one element selected from the group consisting of Ni, Fe and Co.

6. (Previously presented) The spin-valve type thin film magnetic element according to Claim 1, wherein the bias layers comprise an alloy containing at least one element selected from the group consisting of Pt, Pd, Rh, Fe, Ru, Ir, Os, Au, Ag, Cr, Ni, Ne, Ar, Xe and Kr, and Mn.

7. (Cancelled)

8. (Cancelled)

9. (Previously Presented) The spin-valve type thin film magnetic element according to Claim 1, wherein the bias layers comprise an antiferromagnetic material.

10. (Previously Presented) The spin-valve type thin film magnetic element according to Claim 9, wherein the antiferromagnetic material has a lower heat treatment temperature than that of the antiferromagnetic layer.

11. (Previously Presented) The spin-valve type thin film magnetic element according to Claim 1, wherein the free magnetic layer comprises a first free magnetic layer and a second free magnetic layer which are separated by the second non-magnetic intermediate layer, the first free magnetic layer and the second free magnetic layer are in a ferrimagnetic state in which the magnetization direction of the first free magnetic layer is 180 degrees different from the magnetization direction of the second free magnetic layer, at least one of the first free magnetic layer and the second free magnetic layer comprise a CoFeNi alloy, and the second non-magnetic intermediate layer comprises Ru.

12. (Previously Presented) A spin-valve type thin film magnetic element comprising:

a laminate comprising an antiferromagnetic layer, a pinned magnetic layer in contact with an antiferromagnetic layer in which the magnetization direction of the pinned magnetic layer is fixed by an exchange anisotropic magnetic field with the antiferromagnetic layer, and a non-magnetic conductive layer formed between the pinned magnetic layer and a free magnetic layer;

bias layers for aligning the magnetization direction of the free magnetic layer in the direction substantially perpendicular to the magnetization direction of the pinned magnetic layer;

ferromagnetic layers formed in contact with the bias layers; and

conductive layers for applying a sensing current to the free magnetic layer,

wherein each of the ferromagnetic layers is divided into two sub-layers separated by a first non-magnetic intermediate layer, the sub-layers being in a ferrimagnetic state in which the magnetization direction of one sub-layer is 180 degrees different from the magnetization direction of the other sub-layer, and

wherein the free magnetic layer comprises a first free magnetic layer and a second free magnetic layer which are separated by the second non-magnetic

intermediate layer, the first free magnetic layer and the second free magnetic layer are in a ferrimagnetic state in which the magnetization direction of the first free magnetic layer is 180 degrees different from the magnetization direction of the second free magnetic layer, the first free magnetic layer is disposed between the non-magnetic conductive layer and the second non-magnetic intermediate layer, the first free magnetic layer comprises a CoFeNi alloy, and the second non-magnetic intermediate layer comprises Ru.

13. (Previously Presented) A spin-valve type thin film magnetic element comprising:

a laminate comprising an antiferromagnetic layer, a pinned magnetic layer in contact with an antiferromagnetic layer in which the magnetization direction of the pinned magnetic layer is fixed by an exchange anisotropic magnetic field with the antiferromagnetic layer, and a non-magnetic conductive layer formed between the pinned magnetic layer and a free magnetic layer;

bias layers for aligning the magnetization direction of the free magnetic layer in the direction substantially perpendicular to the magnetization direction of the pinned magnetic layer;

ferromagnetic layers formed in contact with the bias layers; and

conductive layers for applying a sensing current to the free magnetic layer,

wherein each of the ferromagnetic layers is divided into two sub-layers separated by a first non-magnetic intermediate layer, the sub-layers being in a ferrimagnetic state in which the magnetization direction of one sub-layer is 180 degrees different from the magnetization direction of the other sub-layer, and

wherein the free magnetic layer comprises a first free magnetic layer and a second free magnetic layer which are separated by the second non-magnetic intermediate layer, the first free magnetic layer and the second free magnetic layer are in a ferrimagnetic state in which the magnetization direction of the first free magnetic layer is 180 degrees different from the magnetization direction of the second free magnetic layer, the first free magnetic layer is disposed between the non-magnetic conductive layer and the second non-magnetic intermediate layer, both the first free magnetic layer and the second free magnetic layer

comprise the CoFeNi alloy, and the second non-magnetic intermediate layer comprises Ru.

14. (Previously Presented) A spin-valve type thin film magnetic element comprising:

a laminate comprising an antiferromagnetic layer, a pinned magnetic layer in contact with an antiferromagnetic layer in which the magnetization direction of the pinned magnetic layer is fixed by an exchange anisotropic magnetic field with the antiferromagnetic layer, and a non-magnetic conductive layer formed between the pinned magnetic layer and a free magnetic layer;

bias layers for aligning the magnetization direction of the free magnetic layer in the direction substantially perpendicular to the magnetization direction of the pinned magnetic layer;

ferromagnetic layers formed in contact with the bias layers; and

conductive layers for applying a sensing current to the free magnetic layer,

wherein each of the ferromagnetic layers is divided into two sub-layers separated by a first non-magnetic intermediate layer, the sub-layers being in a ferrimagnetic state in which the magnetization direction of one sub-layer is 180 degrees different from the magnetization direction of the other sub-layer, and

wherein the free magnetic layer comprises a first free magnetic layer and a second free magnetic layer which are separated by the second non-magnetic intermediate layer, the first free magnetic layer and the second free magnetic layer are in a ferrimagnetic state in which the magnetization direction of the first free magnetic layer is 180 degrees different from the magnetization direction of the second free magnetic layer, the first free magnetic layer is disposed between the non-magnetic conductive layer and the second non-magnetic intermediate layer, at least one of the first free magnetic layer and the second free magnetic layer comprise a CoFeNi alloy, the CoFeNi alloy comprises 9 to 17 atomic percent Fe, 0.5 to 10 atomic percent Ni, and the balance being Co, and the second non-magnetic intermediate layer comprises Ru.

15. (Previously Presented) A spin-valve type thin film magnetic element comprising:

a laminate comprising an antiferromagnetic layer, a pinned magnetic layer in contact with an antiferromagnetic layer in which the magnetization direction of the pinned magnetic layer is fixed by an exchange anisotropic magnetic field with the antiferromagnetic layer, and a non-magnetic conductive layer formed between the pinned magnetic layer and a free magnetic layer;

bias layers for aligning the magnetization direction of the free magnetic layer in the direction substantially perpendicular to the magnetization direction of the pinned magnetic layer;

ferromagnetic layers formed in contact with the bias layers; and

conductive layers for applying a sensing current to the free magnetic layer,

wherein each of the ferromagnetic layers is divided into two sub-layers separated by a first non-magnetic intermediate layer, the sub-layers being in a ferrimagnetic state in which the magnetization direction of one sub-layer is 180 degrees different from the magnetization direction of the other sub-layer, and

wherein the free magnetic layer comprises a first free magnetic layer and a second free magnetic layer which are separated by the second non-magnetic intermediate layer, the first free magnetic layer and the second free magnetic layer are in a ferrimagnetic state in which the magnetization direction of the first free magnetic layer is 180 degrees different from the magnetization direction of the second free magnetic layer, the first free magnetic layer is disposed between the non-magnetic conductive layer and the second non-magnetic intermediate layer, the first free magnetic layer comprises a laminate of a CoFe alloy film and a CoFeNi alloy film, and the CoFe alloy film is formed at the non-magnetic conductive layer side, and the second non-magnetic intermediate layer comprises Ru.

16. (Previously Presented) The spin-valve type thin film magnetic element according to Claim 15, wherein the second free magnetic layer comprises the CoFeNi alloy.

17. (Previously Presented) The spin-valve type thin film magnetic element according to Claim 15, wherein the CoFeNi alloy film comprises 9 to 17 atomic percent Fe, 0.5 to 10 atomic percent Ni, and the balance being Co.

18. (Previously Presented) The spin-valve type thin film magnetic element according to Claim 1, wherein the ferromagnetic layer comprises a first ferromagnetic layer and a second ferromagnetic layer which are separated by the first non-magnetic intermediate layer, the first ferromagnetic layer and the second ferromagnetic layer are in a ferrimagnetic state in which the magnetization direction of the first ferromagnetic layer is 180 degrees different from the magnetization direction of the second ferromagnetic layer, at least one of the first ferromagnetic layer and the second ferromagnetic layer comprise a CoFeNi alloy, and the first non-magnetic intermediate layer comprises Ru.

19. (Previously Presented) The spin-valve type thin film magnetic element according to Claim 18, wherein both the first ferromagnetic layer and the second ferromagnetic layer comprise the CoFeNi alloy.